Table 5.2-15. Cost Effectiveness of SCR and SCONOx Units

Cost Parameter[a]	SCONOx System (per SCONOx unit)	SCONOx Remarks	SCR/CO Catalyst System (per SCR/ CO unit)	Remarks
CAPITAL COSTS				
Direct Capital Costs				
SCONOx System	$11,200,000	Reference[b]		
SCONOx Catalyst	$16,800,000	Reference[b]		
SCR Catalyst Modules			$800,000	Reference[b]
CO Catalyst Modules			$1,400,000	Reference[b]
Aqueous Ammonia System			$700,000	Reference[b]
Total Equipment Cost (EC)	$28,000,000		$2,900,000	
Auxiliaries	Included above		$290,000	10% of EC
Foundation & Supports	$2,240,000	8% of EC	$232,000	8% of EC
Erection	$2,800,000	10% of EC	$290,000	10% of EC
Electrical Installation	$1,120,000	4% of EC	$116,000	4% of EC
Painting	$280,000	1% of EC	$29,000	1% of EC
Insulation	$280,000	1% of EC	$29,000	1% of EC
Engineering	$2,800,000	10% of EC	$290,000	10% of EC
Taxes	$2,100,000	7.5% of EC	$217,500	7.5% of EC
Freight	$1,400,000	5% of EC	$145,000	5% of EC
Total Direct Capital Cost (DCC)	$41,020,000		$4,538,500	
Indirect Capital Costs				
Contingency	$8,204,000	20% of DCC	$907,700	20% of DCC
Engineering and Supervision	$4,102,000	10% of DCC	$453,800	10% of DCC
Construction and Field Expense	$2,051,000	5% of DCC	$226,900	5% of DCC
Construction Fee	$4,102,000	10% of DCC	$453,800	10% of DCC
Start-Up Assistance	$820,400	2% of DCC	$90,800	2% of DCC
Performance Test	$410,200	1% of DCC	$45,400	1% of DCC
Total Indirect Capital	**$19,689,600**		**$2,178,500**	
Total Capital Investment (TCI)	**$60,709,600**		**$6,717,000**	
ANNUAL COSTS				
SCONOx Catalyst Washing		$480,000 per row, 3 rows[b]		
1st row each year	$480,000			
2nd and 3rd rows, every 3 years	$365,760	CRF = 0.381 (7%, 3yr)		
Catalyst Replacement SCONOx Catalyst		$16,800,000 cost for 3 rows		
1st row	$797,440	10 year life, CRF = 0.1424		
2nd & 3rd rows	$907,200	30 year life, CRF = 0.081		

Table 5.2-15. Cost Effectiveness of SCR and SCONOx Units (Continued)

Cost Parameter[a]	SCONOx System (per SCONOx unit)	SCONOx Remarks	SCR/CO Catalyst System (per SCR/ CO unit)	Remarks
CO catalyst			$342,900	$900,000 cost, 3 yr life, CRF = 0.381
SCR catalyst			$152,400	$400,000 cost, 3 yr life, CRF = 0.381
Auxiliary Power - Energy Cost	$16,556	30 kW @ $0.063/kWh	$16,556	30kW @ $0.063/kWh
Exhaust Pressure Loss - Energy Cost	$883,008	1600 kW @ $0.063/kWh	$397,354	720 kW @ $0.063/kWh
Aqueous Ammonia Usage			$105,000	700 TPY NH_3 usage @ $150/ton
Steam Usage	$3,223,680	46 klb/hr, 600F, 85 psig @ $8/klb.		
Natural Gas	$756,759	600 lb/hr, 0.023 MMBtu/lb $6.26/MMBtu		
Operating Labor	$201,509	300% of SCR/CO Case	$67,170	1% of TCI
Supervisory Labor	$30,226	15% of Operating Labor	$10,075	15% of Operating Labor
Administration	$134,340	Same as SCR/CO Case	$134,340	2% of TCI
Taxes and Insurance	$607,096	1% of TCI	$67,170	1% of TCI
Capital Recovery	$6,252,727	TCI - catalyst cost, CRF of .1424 (7%, 10 yr)	$956,498	CRF of .1424 (7%, 10 yr)
Total Annual Cost	$14,656,302		$2,249,463	
COST EFFECTIVENESS				
NO_X Emissions Controlled (TPY)[c]	461		461	
CO Emissions Controlled (TPY)[d]	137		137	
NH3 Emissions Controlled (TPY)[e]	104		0	
NO_X Control Effectiveness ($/ton)	$31,792		$4,880	
CO Control Effectiveness ($/ton)	$106,980		$16,419	
CO + NO_X ($/ton)	$24,509		$3,762	
NH3 Control Effectiveness ($/ton)[f]	$140,926			

Notes:

a Costs are based on 7% interest and a 10-year project life.

b Quotes made available to URS.

c Reduction of NOX from 9.0 to 2.0 ppm.

d Reduction of CO from 9.0 to 6.0 ppm.

e Based on 5 ppm ammonia slip.

f NH_3 cost effectiveness based on incremental cost of $SCONO_x$ versus SCR/CO per ton of NH_3 produced by SCR/CO catalyst.